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THE SITKA SPRUCE WEEVIL
(Pissodes sitchensis)

By H.E. Burke

Family Curculionidae - Order Coleoptera

Economic Importance

The Sitka Spruce Weevil (Pissodes sitchensis) is the most injurious insect enemy of the reproduction of Sitka spruce in the Northwest. This small snout beetle attacks and kills or seriously injures the terminal shoots of many young trees. As a tree cannot reach full development without a terminal it is held back until one of the laterals over-tops its fellows and takes the place of the destroyed shoot. A great deal of important time and energy are thus wasted, and the tree is apt to be crowded out by its more favored companions. Then, in taking the place of the terminal, the lateral grows in more or less of a curve and a crooked trunk is apt to be formed. Sometimes, too, though rarely, no single lateral can gain the lead and a forked and worthless tree is produced.

History

The Sitka Spruce Weevil was first described in 1911 by Dr. A. D. Hopkins from specimens collected in Oregon and Washington by H. E. Burke.

Description of the Insect

The Sitka spruce weevil belongs to the group or family of snout beetles known as Curculionidae. They may be recognized by their long, peculiarly shaped beaks or snouts. This insect passes

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Track down Hopkins Notebook Series # 18917 circa 1930? for date

From H.E. Burke 1904 - 1958 folder

through four stages during its life cycle. The adult female weevils lay eggs, in the terminal shoots of Sitka spruce and from these the larvae hatch and feed downward in the cambium. At the end of the feeding and growing period the insects pass through a pupal or resting stage before transforming to adult weevils which feed, mate and lay more eggs.

Description of the egg

Characters common to the species of the genus Pissodes are: Eggs, pearly white, slightly oblong, and equally rounded at both ends.

Description of the larvae

The larvae of the Sitka spruce weevil are elongate, cylindrical, yellowish white, footless; body with 12 closely wrinkled segments, those of the thorax not larger or more permanent than the first abdominal.

Description of the pupa

Of the general size and form of the adults, with the beak folded on the mesosterna and metasterna; tips of the posterior torsi even with tips of wing-pads; head, beak, and abdominal segments armed with spines, the ninth abdominal having two rather prominent epipleural spines.

Description of the adult

The Sitka spruce weevil is a small, grayish, mottled-snout beetle varying in length from 5 to 5.3 mm. The color ranges from

light to dark brown. The spots of scales vary in size, color, and density, and there is some variation in the relative width of the prothorax and in the size of the punctures of the elytrial striae.

The beak is slender and shorter than the prothorax in some species and longer in others. The third and fifth elytral interspaces are moderately to strongly elevated and rugose. They have large anterior spots on the elytra. The elytral striae are rather coarse punctured. They are most easily identified by their distribution and habits.

Description of the Work

The indications of an attack by Pissodes are the punctures in the bark made by the adult for food and oviposition. These cause a slight flow of resin which might be noticed by a close observer. About the middle of July or the first of August the new shoots which have grown from the top of the infested terminal begin to wilt. Examination will probably show the bark of the last year's terminal dead and loose, with Pissodes larvae and pupae, dipterous larvae, and hymenopterous larvae and cocoons beneath it. The wilting of the top shoots soon becomes more evident and the needles begin to turn yellow, brown and red. By the middle of August, or even some time before, the death of the top is plainly evident and the needles begin to fall. In some

cases all fall off before spring, while in others they may keep their color and hang on until the next spring or summer.

After the needles fall the withered shoots and the bark get blown or rubbed off and only the weather-beaten stub of the terminal remains. The laterals at the base of this begin a fight for supremacy. Usually one soon overtops the rest and grows up to form the main trunk.

Food Plants

The Sitka Spruce (Picea sitchensis F. & M.) is the only species of tree from which this insect has been reported.

Distribution

This weevil probably occurs over the entire range of Sitka Spruce, in the coast region and inland about fifty miles from Alaska to northern California. It occurs in Alaska, British Columbia, Washington and Oregon.

Life History and Habits

The adult female weevils lay their eggs in the late spring and summer, in little cavities in the bark of the previous year's growth of the terminals or rarely in a lateral. If a lateral is attacked it is almost invariably because the terminal has already been killed a year or two before. The egg-cavities are placed irregularly up and down the terminal, for several inches or more, and usually in the upper half near the tip just below the bud or

new shoot of the year. Two eggs are usually placed in each cavity. Although eggs are usually laid in bark of the previous year's growth they may sometimes be laid in that which was formed two years before.

Soon after the eggs are laid, the young larvae hatch out and work down the terminal, boring through the bark and into the wood until at last they reach maturity, form an oval,shredded, covered cell in the wood or pith and pupate. Where the terminal is large and vigorous and the wood is thick the pupal cells are formed in the outer wood, but where the terminal is small and the wood is thin they are formed in the pith.

In the younger stages each larva makes a separate mine for itself. As the individuals grow larger and work downward these mines run into one another, and a large common mine containing many larvae is formed. Often the bark is completely separated from the wood.

As some larvae have better conditions for development than others, they reach maturity first and form their pupal cells. The others keep on working down the shoat until they in turn reach full development and pupate. Pupal cells will therefore be found up and down the infested shoat from near the top to the bottom. Most are near the bottom, however.

Pissodes sitchensis Hopk. appears to be single brooded. Part of the brood, however, may emerge in the fall and part in the following spring or summer. The only eggs seen were collected in June. Active larvae were collected in June, August, and October. Full-grown larvae and pupae were obtained from the pupal cells every month from May to November, while young adults were found in the pupal cells during June, August, September, October and November.

The insect seems to pass the winter in all stages except the egg. Large larvae, pupae and young adults were about equally common in the pupal cells during the last examinations made in October and November and the first in May and June.

After emerging, the adult spends some time feeding. As observed in the laboratory, it makes numerous punctures in the bark of young shoots. But it will probably feed readily on any fresh bark.

Seasonal History

Adult pissodes appear in the late spring and summer and lay eggs in the terminal shoots of Sitka spruce. The eggs soon hatch and the resulting larvae feed and appear to develop at varying rates of speed. It appears that from eggs laid in June some larvae develop rapidly, pupate in August, change to young adults, and emerge in August or September, while others develop very slowly, remain over winter and the following spring in the larval stage, pupate in May

or June, and change to adults and emerge during the second summer. Many intermediate cases occur, so we have an overlapping of broods.

The insects pass the winter in all stages except the egg.

Ecological Relationships

Pissodes sitchensis confines its attack almost entirely to the previous year's growth on the terminal shoats of Sitka spruce. Laterals are never attacked unless the terminal has previously been killed. Small trees, two to eight inches in diameter, and five to twenty-five feet high areusually the most susceptible to attack. No large old trees were found to be infested. The adults will feed on the bark of the bases of old trees when caged, and they may do this at all times.

Prevention and Control Methods

Artificial Control: By cutting the infested shoots in May and September and placing them in tight cages this insect should be readily controlled. The parasites will hatch out and can be liberated, while the Pissodes can be caught and destroyed. If this is carefully carried on for a few years to catch the broods from the old adults that were in hibernation at the first collection the insect should be practically exterminated. If the infested shoots are carefully cut from the tops of the trees and some pruning is done to give one leading branch a clear field, the tree will soon straighten up(?) and no bad effects will result from the attack of the weevil(?).

Natural Control: Predacians,- Dipteron, larvae of Louchaea polita Say, is the most destructive enemy of Pissodes sitchensis Hopk.

A lepidopteron, near (Dioryctria abietella D & S, an enemy of Pissodes strobi) probably feeds on P. sitchensis.

Hymenopterous parasites, Braconids, Brachychistes, and Macrodyctrium, two chalcids and one cynipid have been reared from Pissodes killed tops.

A bacterial disease seems to destroy some broods; probably caused by too much moisture under bark. The larvae turn black, become watery, swell up and die.

Bibliography

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